REMARKS

Favorable reconsideration of this application is requested in view of the above amendments and the following remarks. Claims 1 and 4-10 are hereby amended.

Claims 1 and 4-10 are amended editorially, removing reference numbers. Claim 1 is further amended to reinforce the implicit position of the measuring device 14. Measuring device 14 axially faces the reflecting surface 13. The amendment is supported by the drawing and claim 1, as previously presented, disclosing that "optical measuring device (14) mounted on a non-rotating part (12) of the vehicle and operatively facing an essentially radial optically reflecting surface". No new matter has been added.

Applicants appreciate the courtesy extended by the Examiner to Applicants' representatives, Robert A. Kalinsky and Margaret F. Emerson, during the telephonic interview on January 12, 2005. During the interview, claims 1, 8, 10, McDearmon (US 6,658,943), Ouchi (US 5,678,933), and Meeker (US 6,773,164) were discussed. Agreement regarding the allowability of the claims was not reached, although tentative agreement to reconsider the allowability of claims 8 and 10 was reached.

Claims 1, 4-7, and 9 were rejected as being unpatentable over McDearmon in view of Ouchi. Applicants traverse this rejection. Claim 1 requires that the optical measuring device 14 is "axially facing an essentially radial optically reflecting surface secured to or integral with the flange for detecting real time variations of the axial position of the surface due to elastic deformation of the flange, the measuring device including emitter means for projecting a light radiation onto the reflecting surface and receiver means for receiving the light radiation reflected back by the reflecting surface, for detecting real time variations of the axial position of the surface due to elastic deformation of the flange caused by forces transmitted from the wheel to

the hub flange". McDearmon teaches sensor modules M detecting **radial** forces exerted on the bearing housing, whereas the claimed invention discloses measuring **axial** deformation of the hub flange. Ouchi adds nothing to McDearmon, as the Ouchi optical device is directed radially and does not involve reflection off of a surface of the flange. The combination of McDearmon and Ouchi fails to teach or suggest direct optical detection of the deformation of a flange caused by forces from a wheel.

Further, the combination of McDearmon and Ouchi fails to teach detecting real time variations of a flange due to forces transmitted from the wheel to the hub flange. The mechanical relay of forces and torques taught by the McDearmon measuring system does not provide a real time measurement of the forces resulting from the wheel. The forces and torques causing the deformation to be detected have to be transferred from the hub flange (26) to the bearing inner races (40), and from there to the rollers (54), and finally to the bearing housing (14). The deformation must follow a path through a kinematic chain constituted by different components being movably mounted with respect to one another. This relay only diminishes the magnitude of the force to be measured, therefore reducing the level of precision of such a measurement.

Due to the force relay taught by McDearmon, the bearing housing will undergo only a fraction of the deformation that found at the hub flange (see column 6, line 20). In contrast, the current invention measures the larger magnitude of deformation directly at the hub flange. As a result, a much higher accuracy in monitoring the loads acting on the hub and detecting real time conditions of impending loss of adhesion (roadholding) between the tire and the road is possible. Further, this accuracy is attained in a standard type of hub-bearing unit, where there is little space available for fitting other devices.

Ouchi teaches optical speed sensors. Ouchi only adds the suggestion of replacing the remotely located radial sensors M of McDearmon with optical devices. One knowledgeable in the art would not look to Ouchi to teach this substitution. The gap (taught in McDearmon),

between the bearing housing (14) and cylinder bore (18), for generating and detecting a beam in the radial direction, is narrow. It would be difficult to fit the sensor of Ouchi in such a space. Even if possible, the current invention's (relative) considerable distance separating the reflecting surface 13 from the sensor measuring device 14 allows detection of any minute elastic deformation that otherwise may not be sensed by a system (such as the force relay system of McDearmon). Even a slight angle of inclination between the transmitted light beam and the received light beam will suffice to detect deformation.

Favorable reconsideration of claims 1, 4-7, and 9 is requested. Claims 4-7 and 9 depend from claim 1.

Claims 8 and 10 were rejected as being unpatentable over McDearmon, in view of Ouchi, and further in view of Meeker. Applicants traverse this rejection. Meeker does not remedy the deficiencies of McDearmon and Ouchi as described above. Further, claim 8 requires that a processing unit automatically controls "the wearable members of the braking system for adapting their position" based on the deformation signals received from the measuring device. Neither McDearmon, Ouchi, nor Meeker suggest an adjustment of the brake pads.

Claim 10 requires that "the measuring device includes an inductive position sensor and that the essentially radial surface is of a metallic material". Neither McDearmon, Ouchi, nor Meeker suggest an inductive position sensor and that the essentially radial surface 13 is of a metallic material.

Favorable reconsideration of claims 8 and 10 is requested.

In view of the above, favorable reconsideration in the form of a notice of allowance is requested. Any questions regarding this communication can be directed to the undersigned attorney, John J. Gresens, Reg. No. 33,112, at (612)371-5265.

Respectfully submitted,

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